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AUTHORSHIP AND NOMENCLATURE OF BUR CLOVERS (MEDICAGO) FOUND WILD IN THE UNITED STATES

LLOYD H. SHINNERS

FEW genera have accumulated a literature so abounding in misquotations, misinterpretations, and misapplications as *Medicago*. The only monograph, the preliminary one by Urban, was published more than eighty years ago. Only a small fraction of the synonymy is included by that author, and his taxonomic treatment is more often a cataloguing of morphological types than a delimitation of biological entities. The same can be said of most of the Old World floras. Lowe's *Manual Flora of Madeira* is almost unique in supplying field observations, and synonymy in critical detail. Recent European floras (e. g., Willi Christiansen, *Neue kritische Flora von Schleswig-Holstein*, 1953) repeat the treatment of Urban with nomenclatural alterations made by Burnat and Briquet, or (P. Fournier, *Les Quatre Flores de la France*, 1946) revert to an assortment of invalid and quite unjustifiable names. Hylander's *Nomenklatorische und systematische Studien* (1945) unfortunately mention only one species, *M. minima*, with an erroneous synonymy and a conclusion which I consider incorrect. What started as a seemingly minor routine task, checking the nomenclature of the species in my *Flora of North Central Texas* (which includes 6 of the 9 generally accepted as part of the North American flora), proved to be the most laborious and intricate bibliographic problem encountered in preparing the entire work.

M. sativa L., *M. falcata* L., and *M. lupulina* L. present no special difficulties. They are therefore not discussed here,

beyond mentioning that *M. lupulina* var. *glandulosa* Neilreich is in my opinion only a minor variation not worthy of varietal rank. The remaining species are a very different matter. The following annotated list gives the names and authorities correct under present rules of nomenclature, so far as I have been able to work them out. Synonymy is not complete, but is believed to include all names of importance in arriving at the accepted nomenclature, and those current in the United States.

M. ARABICA (L.) Hudson, Fl. Ang. 288. 1762. The same combination published later by Allioni, Fl. Pedem. 1: 315. 1785.—*M. polymorpha* var. *arabica* L., Sp. Pl. 2: 780. 1753.—*M. cordata* Desr. in Lam., Encycl. Meth. Bot. 3: 636. Late 1791 or 1792. (Based on the preceding. Desrousseaux states that he does not believe it necessary to retain the Linnaean epithet for the plant "car elle est très-vraisemblablement aussi étrangère à l'Arabie que le *Vicia Benghalensis*, Lin., l'est au Bengale; que la *Scilla Peruviana*, Lin., l'est à l'Amerique; . . .") —*M. maculata* Sibth., Fl. Oxon. 232. 1794. The same name, with *M. polymorpha* var. *arabica* and *M. cordata* listed as synonyms, published later by Willdenow, Sp. Pl. (ed. 4) 3 pt. 2: 1412. 1802.

Early English writers treated *M. arabica* and *M. polymorpha* (*M. hispida*, *M. denticulata*) as one species, under the former name. Bartolini (Cat. Piante . . . di Siena, 1776) listed *Medicago polymorpha arabica* as "nomen triviale" under the diagnostic phrase-name given by Linnaeus for the species *polymorpha*—that is, he used *arabica* in the sense of var. *typica*, or var. *polymorpha*. Nearly all later authors have consistently understood *M. arabica* in the sense that it is today, as delimited in Urban's monograph. According to Urban (1883), the specimen in the Linnaean Herbarium under this name belongs to an entirely different species, "*M. ciliaris* Willd." (considered by Urban as a species newly described in 1802, because of doubt as to its identity with *M. polymorpha* var. *ciliaris* L.; the older *M. ciliaris* (L.) Krockner, 1790, was overlooked). The Linnaean citations are clear, agreeing with nearly all later usage, contradicting the specimen and the exceptional usage of Bartolini. There is no reason to depart from present usage in this case.

M. LACINIATA (L.) Miller, Gard. Dict. (ed. 8), *Medicago* 5. 1768. The same combination published later by Allioni, l. c. 316. 1785.—*M. polymorpha* var. *laciniata* L., l. c. 781. 1753. According to Urban, both the Linnaean specimen and the citations belong to Allioni's (Miller's) species.

M. MINIMA (L.) Bartalini, Catalogo delle Piante . . . alla Città di Siena, pp. 60–61. 1776. The same combination published later by Desrousseaux in Lam., l. c. 636. Late 1791 or 1792.—*M. polymorpha* var. *minima* L., l. c. 780. 1753. Urban states that there is no Linnaean specimen, but that citations indicate Bartalini's species; this is in accord with present usage.

As with *M. arabica*, some early post-Linnaean authors included *M. polymorpha* (*M. hispida*, *M. denticulata*) under this name. The combination is sometimes credited to Linnaeus's student, Grufberg (dissertation, *Flora Anglica*, 1754; Amoen. Acad. 4: 105, 1759), or, in accordance with the early custom of crediting student publications to the supervising professor, to Linnaeus himself. Section Five of Grufberg's work is a list of species "*secundum Systema sexuale*." In Section One, Grufberg explained that to allow easy comparison of the floras of Sweden and England, names of species found in both countries are put in italics. The list is in two columns per page, with bare name only, "*brevitatis caussa*," and with numbers after each species referring to entries in Ray's *Synopsis Stirpium Britanniae*, edition 3. Four medicagos are listed by name, each on a different line, followed by three lines of dashes, for species (or varieties) without Linnaean names listed by Ray:

<i>Medicago falcata</i>	331-1.
<i>lupulina</i>	331-2.
<i>polymor. arab.</i>	331-1.
<i>minima</i>	332-2.
.....	333-3.
.....	333-4.
.....	333-5.

It is possible that the bare name *minima*, on a line by itself, was intended to stand for a species. It is just as possible that a minor error in printing, or failure to indent because of lack of space, was responsible for the implied new combination. The second and third editions of *Species Plantarum* continue to list *minima* as a variety. There does not seem to be con-

vincing evidence of an unequivocal new combination prior to Bartalini's. Hylander (1945) writes "*Medicago minima* L. (Grufberg) 1754 (non *M. minima* Bartalini 1776)." This is certainly an error, perhaps due to the fact that Bartalini's "N. Tr." (nomen triviale) occupies the first line on page 61, followed without break by the phrase-names of species no. 4, including that of Linnaeus's *M. polymorpha*. But Bartalini placed his binomials after the phrase-names, not before. Those phrases belonging with *M. minima*, species no. 3, are at the bottom of the preceding page, and include unequivocally a reference to *M. polymorpha* var. *minima* L., with page citation from the second edition of *Species Plantarum*.

According to Urban, *M. polymorpha* var. *hirsuta* L., Sp. Pl. 2: 780, 1753, is the same as *M. minima*; *M. hirsuta* (L.) Bartal., l. c. 61, is an additional synonym, published at the same time as *M. minima*. Also to be regarded as synonyms, representing minor forms, are var. *compacta* Neyraut (pathological; cf. Reynier, 1906 and 1908) and var. *longiseta* DC., recognized in Fernald's 8th edition of Gray's Manual. Urban accepted var. *longiseta*, short-spined var. *brachyodon* Reichenb., and spineless or nearly spineless var. *pulchella* Lowe, in addition to var. *vulgaris* Urban. Howell (1949) has reported var. *pubescens* Webb from California and var. *viscida* Koch from Arizona. These correspond to f. *pubescens* (Webb) Urban and f. *viscida* (W. Koch) Urban; f. *mollissima* (Roth) Urban is a third form described in the monograph. Unlike his style under *M. hispida*, and contrary to his statement that Greek letters indicated forms rather than varieties, Urban listed the three as if they were varieties, crediting them to Webb, Koch, and (Roth) Koch, respectively. All are listed together immediately following the description of the species; they are not put under var. *vulgaris* nor any of the three other varieties, which are all listed together after the three forms. On grounds of uniformity with other parts of the monograph, and because Greek letters preceded them, Urban's names for the three forms must be regarded as new combinations, though he failed to mark them as such.

M. ORBICULARIS (L.) Bartalini, Catalogo delle Piante . . . alla Città di Siena, p. 60. 1776. The same combination published later by Allioni, Fl. Pedem. 1: 324-325. 1785.—*M.*

polymorpha var. *orbicularis* L., l. c. 779. 1753.—*M. orbiculata* Gaertn., De Fruct. et Semin. Pl. 2: 349. 1791. (An evident error for *orbicularis*.)—Urban states that the Linnaean Herbarium contains under this name two specimens "of the usual form," with 3-4 compact spirals 13-15 mm. in diameter.

M. POLYMORPHA L., Sp. Pl. 2: 779. 1753. This includes the plants commonly known as *M. hispida*, *M. denticulata*, and *M. apiculata* (detailed synonymy given below, under the varieties and forms).

Few Linnaean species have undergone such thorough disintegration as *Medicago polymorpha*. All the thirteen original named varieties were soon raised to specific rank by various authors, and by the early 19th Century, the name *polymorpha* itself went completely out of use. (Later references to, or combinations based on "*M. polymorpha* Willd." were errors for *M. polycarpa* Willd.) Under present rules, however, the name must be reinstated for some member of the original aggregate. Since it has not been in use for a century and a half, it has not become a permanent source of confusion and error. Unlike the names of the yellow-flowered species of *Trifolium*, it cannot be rejected on that account. Urban's account of the Linnaean species reports herbarium specimens of 10 of the 13 varieties, but none marked as *polymorpha* only. The name therefore cannot be typified by a specimen. Linnaeus's understanding of the components of his aggregate was very poor, as revealed in Urban's notes on the specimens and citations. The pre-Linnaean *Historia Plantarum* of Morison was much superior to Linnaean works in the treatment of bur clovers, and gives illustrations. Unfortunately, the Linnaean citations for *Medicago polymorpha* alone (not the varieties) were to publications which offer little help. The diagnostic phrase-name is "*Medicago leguminibus cochleatis, stipulis dentatis, caule diffuso*," quoted from *Hortus Cliffortianus* and *Hortus Upsalien-sis*, and from Royen and Dalibardus. Next is quoted "*Trifolium cochleatum, fructu nigro hispido*," from Bauhin's *Pinax*. No illustrations are cited. Following this is the list of 13 named varieties, each with one or more phrase-names quoted from various authors, and for 7 of them, references to figures.

The fact that the first two phrase-names stand separate from

all the named varieties indicates that the type should not include any of the latter. The doctrine of residues leads to the same conclusion, since all the varieties were early recognized as species under their own names. The only possibly helpful item in the first name-phrase is "*stipulis dentatis*," though this description was applied rather loosely to stipules varying from toothed to rather deeply lobed. The quotation from Bauhin specifies a plant with prickly pods, black at maturity. It is to be assumed that the species *polymorpha* must be a fairly common and widespread plant, and one which was known to Linnaeus. The plant best qualified, as fitting the meagre description, widespread, known to Linnaeus in 1753, and not one of the varieties named at that time, is the later-described var. *nigra* L., which is nomenclaturally identical with *M. hispida* Gaertn. (since the phrase-name for *nigra* is quoted in the original description of the latter, though the epithet is not). According to Urban, Linnaeus had specimens of *M. hispida* var. *pentacycla* (a synonym of var. *hispida*) filed under his varieties *coronata*, *ciliaris*, and *nigra*. The species best known to Bauhin (judging from Binz & Thommen's *Flore de la Suisse*, p. 217, 1941) were *M. arabica*, *M. hispida*, and *M. minima*, of which only the second was not named as a variety by Linnaeus in 1753. (Although much is made here of the suggestiveness of Bauhin's phrase, it is not to be inferred that *Medicago polymorpha* can be positively typified merely on that basis; it is likely that Bauhin included more than one species under his phrase-name.)

Admittedly the above arguments are weak, but something has to be chosen. There are specimens only for some of the Linnaean varieties. The pre-Linnaean citations are inconclusive, and in any case should not be permitted to disturb later usage any more than can be helped. The few possible approaches to redefining *Medicago polymorpha* all point to the complex *M. hispida* Gaertner, as treated by Urban. (Gaertner's figure is, to me, unidentifiable, and suggests *M. ciliaris* more than *M. hispida*; Urban's interpretation, which did not include designation of a type element among the infraspecific taxa, is accepted because it included var. *nigra*, which is technically the basis of the species *hispida*.) The selection of *M. hispida* var. *pentacycla* (DC.) Urban as type element is made on the

grounds that this form was represented in Linnaeus's herbarium, even though misidentified by him under several varietal names. There is flimsy support from the fact that var. *nigra* repeats a key word from Bauhin's phrase-name, and is identical with var. *pentacycla*. *Medicago hispida* as delimited by Urban is still quite polymorphic (a total of 15 infraspecific taxa are named); it is a common and widespread species (though less so in Linnaeus's or Bauhin's time than now); a majority of its forms have spiny pods, black at full maturity; it was known to Linnaeus in 1753, though not well understood by him. Lastly, replacement of *M. hispida* by *M. polymorpha* involves no general displacement of names in the genus, and need not occasion any great confusion. *Medicago polymorpha* Linnaeus is therefore here typified by the element later named var. *nigra*, or *M. hispida* var. *pentacycla* f. *longeaculeata* of Urban's monograph, p. 75.

As with *M. arabica* and *M. minima*, early writers frequently included more than one species or variety (as now understood) under the same name. Fortunately, Urban clarified the Linnaean and many post-Linnaean names so that the purely bibliographic phase of revising his nomenclature is less formidable than it might have been. The biological interpretation of the taxa is far more difficult. No adequate account can be made without extensive investigations in the Old World, including intensive field work, and cultural and cytogenetic studies. Geographic evidence—so far as it can be gleaned from published floras—suggests that Urban's arrangement of infraspecific categories (disregarding named forms) is a reasonable one, and may justifiably be retained for the present. It should be mentioned here that on page 44 of his monograph, Urban states that single Latin letters indicate varieties, Greek letters, forms. The latter have been erroneously quoted by Burnat and Briquet as subvarieties.

Urban's primary groups (aa. *microcarpa* and bb. *macrocarpa*) are at the level of subspecies, but were given no designation of rank by him; they are designated subspecies in Christiansen's *Neue kritische Flora von Schleswig-Holstein* (1953, p. 313). To avoid nomenclatural complications, they are not transferred here (see discussion under var. *ciliaris*). Only the last two

varieties occur in the United States (one of these as yet only under cultivation). For completeness, the two strictly Old World varieties are also included, and essential synonymy given for all four. Following is a translation and partial revision of Urban's key (omitting forms), with order reversed because of modified typification. As additional characters under leads 1a-1b, Urban has "veinlets of legume anastomosing freely and well before reaching lateral nerves" vs. "veinlets of legume anastomosing only close to lateral nerves, or not at all." These statements contradict descriptions given by some European writers, and do not fit the specimens which have been examined; they are therefore omitted.

- 1a. Diameter of middle spirals of legume 7-10 mm.
- 2a. Spirals 4-6. var. *polymorpha*.
- 2b. Spirals $1\frac{1}{2}$ -4. var. *tricycla*.
- 1b. Diameter of middle spirals of legume 4-6 mm.
- 3a. Spirals 5-6. var. *polygyra*.
- 3b. Spirals $1\frac{1}{2}$ - $3\frac{1}{2}$ var. *ciliaris*.

M. POLYMORPHA var. *POLYMORPHA*. *M. polymorpha* L., Sp. Pl. 2: 779. 1753. (Emended.)—*M. polymorpha* var. *nigra* L., Mant. Pl. 2: 454. 1771.—*M. hispida* Gaertn., De Fruct. et Semin. Pl. 2: 349. 1791. (Based on the preceding.)—*M. lappacea* Desr. in Lam., Encycl. Meth. Bot. 3: 637-638. Late 1791 or 1792. (*M. polymorpha* var. *ciliaris*, *M. polymorpha* var. *nigra*, *M. hispida*, all cited as synonyms.)—*M. nigra* (L.) Willd., Sp. Pl. (ed. 4) 3 pt. 2: 1418-1419. 1802.—*M. denticulata* var. *lappacea* (Desr.) Benth., Cat. Pl. Ind. Pyr. p. 103. 1826.—*M. lappacea* var. *macracantha* (Webb & Berth.) Lowe, Man. Fl. Madeira p. 158. 1868. (Based on *M. denticulata* var. *macracantha* Webb & Berth., Phyt. Canar. 2: 64. 1836-1840. This reference not seen. Lowe cites as synonyms *M. lappacea* Desr., *M. nigra* "(Willd.) DC.")

According to Urban the following also belong here. *M. pentacycla* DC., Cat. Hort. Monsp. p. 124. 1813. *M. lappacea* var. *pentacycla* (DC.) Gren. & Godr., Fl. Fr. 1: 390. 1848.—*M. hispida* (bb. *macrocarpa*) var. *pentacycla* (DC.) Urban, Verh. Bot. Ver. Prov. Brandenb. 15: 75. 1873.

M. POLYMORPHA var. *tricycla* (Gren. & Godr.¹) Shinnars, comb. nov. *M. lappacea* var. *tricycla* Gren. & Godr., Fl. Fr. 1: 390. 1848. "Varie à courtes et à longues épines." The form

with long spines is taken as type.—*M. hispida* (bb. *macrocarpa*) var. *tricycla* (Gren. & Godr.) Urban, Ind. Hort. Bot. Berol. 1872 App. p. 3. (Not seen. Repeated in Verh. Bot. Ver. Prov. Brandenb. 15: 75. 1873.)—*M. hispida* (aa. *macrocarpa*) var. *tricycla* f. *longispina* Urban, 11. cc. Including f. *microdon* (Ehrenb.) Urban, 11. cc., based on *M. microdon* Ehrenb., Cat. Sem. Hort. Berol. 1827 (not seen). Urban also lists "*M. obscura* var. *microdon* (Ehrenb.) Visiani" as synonym of this form, but Visiani (Fl. Dalm. 3: 284, 1852) merely comments that Ehrenberg's plant "est varietas tuberculata *M. obscurae*," without making any formal transfer.

M. POLYMORPHA var. ***polygyra*** (Urban) Shinnerson, comb. nov. *M. hispida* (aa. *macrocarpa*) var. *polygyra* Urban, Ind. Hort. Bot. Berol. 1872 App. p. 4 (not seen); Verh. Bot. Ver. Prov. Brandenb. 15: 74. 1873. Two forms are named (f. *inermis* Urban, f. *aculeata* Urban); the first is taken as the typical form.—*M. reticulata* Benth., Cat. Pl. Ind. Pyr. p. 101. 1826.

Judging from published references, this is a fairly definite geographic variety of the western Mediterranean region, spineless or with very short spines. In recent years experimental plantings of it have been made in Texas, under the erroneous name *M. sardoa*, which is a synonym of the next variety. *M. polymorpha* var. *polygyra* has not so far been found as a wild plant.

M. POLYMORPHA var. ***ciliaris*** (Ser.) Shinnerson, comb. nov. *M. denticulata* var. *ciliaris* Ser. in DC., Prodr. 2: 176. 1825. "M. *ciliaris* Savi cent. p. 148, non Willd." It is very unfortunate that Seringe did not supply a different epithet for this plant, so as to avoid confusion with *M. ciliaris* (L.) Krockner, based on *M. polymorpha* var. *ciliaris* L. As published, *M. denticulata* var. *ciliaris* must be treated as a new name, and is the first to be applied in varietal rank to the most widespread and commonly planted of the bur clovers. The identity of Savi's plant does not affect the application of Seringe's name, since the latter also gave a very brief description ("*aculeis elongatis*"), thereby validly publishing a new variety.

An awkward situation arises in connection with the nomenclature of this variety, due to conflict between Article 35 of the

¹ In a footnote under Leguminosae in the Flore de France it is stated "auctore Godron." The established custom of attributing new names to both authors is followed here, although very precisely only Godron should be mentioned.

International Code ("If any infraspecific taxon which includes the nomenclatural type of the epithet of the next higher taxon is to be mentioned by a subdivisional name, that name must repeat the epithet of the higher taxon unaltered") and paragraph 3 of Article 16 ("For any taxon below the rank of genus the correct name is the combination of the generic name with the earliest available legitimate epithet or epithets validly published with the same rank"). On grounds of priority, it is necessary to adopt the combination *M. polymorpha* var. *ciliaris*. But if subspecies are recognized, *M. hispida* ssp. *microcarpa* Urban (emend. W. Christiansen) must be transferred to *M. polymorpha*. Since it is identical as to type with var. *ciliaris*, and since var. *polygyra* would also be recognized under it, Article 35 would require the rejection of var. *ciliaris*, and adoption in its place of the new name, var. *microcarpa*, cited without author. The use of automatic epithets for typical varieties is a happy improvement when applied only to the type of a species. When extended to subspecies and varieties additional to the type, it becomes a very mixed blessing. I personally would retain Article 35 only for a hierarchy of epithets indicating the type of a species, but would reverse it with regard to other subspecies or varieties than the typical ones, on the grounds that only thus could changes of names be kept at a minimum. In the present case, for example, it would be more reasonable to say that var. *ciliaris*, being the oldest varietal epithet, must be retained; that as the earliest one, it should supply the subspecific epithet for any subsequent varieties associated with it. In other words, we would say ssp. *ciliaris* (no author) var. *ciliaris* (Ser.) Shinnery, rather than ssp. *microcarpa* (new combination) var. *microcarpa* (no author). Whichever procedure is followed, one has the license, so to speak, to remove names at will, merely by creating a new one in another category. As Article 35 stands now, the number of changes which must be or could be made is appallingly large. It would be made much smaller by the reversed arrangement for non-typical subspecies here suggested, though not entirely eliminated. For the present, the whole problem is evaded by omitting subspecies entirely.

An additional synonym of *M. polymorpha* var. *ciliaris* is *M. hispida* (aa. *microcarpa*) var. *oligogyra* Urban, 11. cc. Urban

lists three forms, treated by many recent authors as varieties, and by some as species. They are assigned names here solely for purposes of discussion, and convenience in listing synonymy.

M. POLYMORPHA var. *CILIARIS* f. *CILIARIS*. Length of spines equalling or exceeding radius of spirals. This is the plant which passes in the United States as typical *M. hispida*, which it is in the sense of Urban, but not as to type. True *hispida* (*M. polymorpha* as here delimited) is not found either wild or commonly cultivated in this country. There is a long list of actual and *sensu* synonyms for f. *ciliaris*; only the following need be listed here. *M. denticulata* Willd., Sp. Pl. (ed. 4) 3 pt. 2: 1414. 1802.—*M. denticulata* var. *vulgaris* Benth., Cat. Pl. Ind. Pyr. p. 103. 1826. (Fide Visiani.)—*M. hispida* (aa. *microcarpa*) var. *oligogyra* f. *denticulata* (Willd.) Urban, 11. cc.

M. POLYMORPHA var. *CILIARIS* f. ***apiculata*** (Willd., emend. Urban) Shinnners, comb. nov. Spines shorter than radius of spirals. *M. apiculata* Willd., l. c. 1414. 1802. (As delimited by Urban, 11. cc.)—*M. hispida* (aa. *microcarpa*) var. *oligogyra* f. *apiculata* (Willd.) Urban, 11. cc.—*M. hispida* var. *apiculata* (Willd.) Burnat, Fl. Alpes Mar. 2: 106. 1896.—*M. denticulata* var. *brevispina* Benth., Cat. Pl. Ind. Pyr. p. 103. 1826. (Fide Visiani.)—According to Grenier & Godron and others, the following belongs here. *M. sardoa* Moris, Stirp. Sard. Elench. p. 15, 1827 (*nomen nudum*); ex G. Don, Gen. Syst. Dichlam. Pl. 2: 170. 1832. As mentioned before, plants in experimental cultivation as *M. sardoa* are *M. polymorpha* var. *polygyra*, or *M. reticulata* Benth.

M. POLYMORPHA var. *CILIARIS* f. ***tuberculata*** (Gren. & Godr.) Shinnners, comb. nov. Spines absent; spirals smooth or merely tubercled. *M. polycarpa* var. *tuberculata* Gren. & Godr., Fl. Fr. 1: 390. 1848.—*M. hispida* (aa. *microcarpa*) var. *oligogyra* f. *tuberculata* (Gren. & Godr.) Urban, 11. cc.—*M. apiculata* var. *confinis* W. Koch, Syn. Fl. Germ. Helv. p. 164. 1835.—*M. hispida* var. *confinis* (W. Koch) Burnat, Fl. Alpes Mar. 2: 106. 1896.—The name *apiculata* has been applied to this form, and Willdenow's original description ("margine muricatis," "margine tuberculis admodum parvis spinescentibus obsita") suggests that he had this chiefly in mind. There is no sharp break between the three forms. Urban, who examined the

Willdenovian herbarium, was entitled to emphasize "spinescentibus" in delimiting the form as he did. It should be noted here that Grenier & Godron do not mention the earlier-named *M. tuberculata* Moris, Fl. Sard. 1: 447, 1837. They do list as synonym of their var. *tuberculata* "*M. confinis* Koch, olim," overlooking the fact that Koch had put his epithet into print, as a variety.

The three above forms intergrade completely. In the United States, selection of seed for agronomic purposes tends to fix a limited number of forms. Since escapes from cultivation are a major source of our wild plants, there is in reality an artificial selection, giving the impression that the forms are better marked or more permanent than is really the case. In eastern Texas, f. *ciliaris* is a common weed, while f. *tuberculata* is rare. The two intergrade freely when growing together, and this is said to be true of these two and var. *polygyra* when grown together under cultivation. Comments of some European authors (especially Lowe and Visiani) indicate that this is also true where the plants are native, and justifies Urban's treatment of the three so-called species as forms. Reasons for accepting var. *polygyra* in that rank (likewise Urban's treatment) have already been mentioned.

M. PRAECOX DC., Cat. Hort. Bot. Monsp., pp. 123-124. 1813. Reported by J. T. Howell as found in 1954 in Butte and Tehama counties, California (Leaf. West. Bot. 7: 199, 1954).

Only those works giving helpful taxonomic, ecological, or geographical information are listed below. I am indebted to Mrs. Lazella Schwarten, Librarian, Harvard University Herbarium, for transcriptions of the original descriptions of *Medicago reticulata* Benthams and *M. sardoa* Moris.—SOUTHERN METHODIST UNIVERSITY, DALLAS, TEXAS.

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THE VARIATIONS OF
LILIUM CANADENSE LINNAEUS¹

B. BOIVIN AND W. J. CODY

IN the New Britton and Brown Illustrated Flora 1: 418. 1952, H. A. Gleason, apparently following the opinion expressed by E. D. Hull, RHODORA 44: 220-7. 1942, has placed *Lilium michiganense* Farwell in the synonymy of *L. superbum* L. In RHODORA 44: 453-6. 1942, Hull's opinion was carefully discussed and refuted by E. T. Wherry, who pointed out numerous differences between the two entities in pubescence of the leaves, dorsal ribbing of the tepals, length and curvature of the stamens, and extent of green zone at base of tepals. To these differences, M. L. Fernald, in Gray's Manual of Botany, 8th ed., 1950, p. 435, has added another character derived from the inflorescence. We agree with Wherry and Fernald that these two entities are distinct, but the degree of distinctiveness is not as sharp as Wherry would lead one to believe. While *L. michiganense* is normally minutely scabrous along the margin of leaves and on the back of the main veins, occasional smooth specimens, such as *L. H. Wright*, Yates Co., N. Y., do exist and papillose leaf-margins and veins occur in *L. superbum*. In the latter species the anthers are longer, narrower and curved, but they may be as short as 11 mm. as shown by specimens and described by Wherry. On the other hand the anthers of *L. michiganense* are generally shorter, thicker and straight, but may occasionally be curved or thin and, as described by Fernald, up to 17 mm. long. The dorsal ribbing of the perianth segments was quite clearly illustrated by Wherry, op. cit., p. 454, but an occasional specimen of *L. michiganense* will show the characteristic ribs of *L. superbum*. Unfortunately, the extent of the green zone at the base of the tepals cannot be checked on dried specimens, but this difference does not appear to be very sharp. It is described by Wherry, loc. cit., as follows: "In . . . *L. michiganense* this green area is mostly less than 10 mm. long In *L. superbum* it is 10 to 15 mm. long"

Heavily flowered specimens of *L. superbum* most often have the flowers in racemes; but umbellate, few-flowered and one-

¹ Contribution No. 1488, from the Botany and Plant Pathology Division, Science Service, Canada Department of Agriculture, Ottawa, Ontario.

flowered specimens which have the same type of inflorescence as *L. michiganense*, also occur. However, *L. michiganense* never presents the racemose type of inflorescence.

In none of the six characters discussed above are these two entities sharply distinct; and, as frequent intermediates occur, retention of these taxa at specific level does not seem to be warranted. The two populations, however, are fairly well marked and most specimens can be referred quite satisfactorily to one or the other taxon and retention at an infraspecific level seems amply justified on the basis of the characters described by Wherry.

L. michiganense is more closely related to *L. canadense* than to *L. superbum*. This was brought out by Wherry, op. cit., p. 435, who stated that "the intermediate *L. michiganense* surely does not 'belong to *L. superbum*,' lying instead close to *L. canadense*."

With the above statement we are in full agreement, although on general appearance alone *L. michiganense* could be readily confused with *L. superbum* because both entities have strongly recurved red-suffused tepals.

The degree of distinctiveness of *L. michiganense* and *L. canadense* was submitted to close scrutiny. Of the four usually recognized diagnostic characters, one, the flower color, could not be used with any degree of accuracy because, upon drying, flowers often become more reddish or lose all traces of red color. This change in color is evidenced by the discrepancies between field notes and the present color of the dried flower.

The three other characters are as follows:

<i>L. canadense</i>	<i>L. michiganense</i>
1—Tepals arched, not recurved; stamens and style usually included or nearly so.	1—Tepals strongly recurved, their tips nearly reaching or surpassing the summit of the tube; stamens and style long exserted.
2—Filaments straight or nearly so.	2—Filaments outwardly arched, frequently incurved at tip.
3—Stigma deeply lobed.	3—Stigma merely emarginate, subglobose to shallowly lobed.

Of the 75 odd sheets at hand, only 49 have fully developed flowers showing all characters listed above. Sorting the specimens for all three characters gives us the following results:

12 specimens are typical *L. canadense*
 10 specimens are typical *L. michiganense*
 27 specimens are intermediate

This is a very high ratio of intermediates, but 17 of these intermediates are intermediate for style only. If we contrast this number of 17 intermediates for style against the 10 and 12 specimens of each entity that are typical for all three characters, it is obvious that the lobation of the style has no diagnostic value whatsoever.

Re-sorting our specimens for the first two characters only gives us the following results and distributions:

17 specimens are typical *L. canadense*: 4 Nova Scotia, 2 New Brunswick, 7 Quebec, 1 New York, 2 Pennsylvania and 1 West Virginia.
 22 specimens are typical *L. michiganense*: 14 Ontario, 1 Indiana, 1 Illinois, 3 Michigan, 1 Wisconsin, 1 Minnesota and 1 Kansas.
 10 specimens are intermediate: 1 Nova Scotia, 1 New Brunswick, 2 Quebec, 4 Ontario, 1 Massachusetts and 1 Pennsylvania.

With only two diagnostic characters and such a high proportion of intermediates, retention of specific status for these two entities seems unjustified. Yet the two populations appear to be sufficiently distinct both morphologically and geographically to warrant retention at an infraspecific level.

We therefore consider that the recognized taxa of the *Lilium canadense* group should be brought together and subordinated as follows:

Lilium canadense L.

ssp. *canadense*

var. *canadense*

f. *canadense*

f. *rubrum* Britton

var. *editorum* Fern.

ssp. *michiganense* (Farwell) Boivin & Cody

f. *michiganense*

f. *uniflorum* (Farwell) Boivin & Cody

f. *peramoenum* (Farwell) Boivin & Cody

ssp. *superbum* (L.) Boivin & Cody

These taxa may be briefly characterized as follows:

LILIUM CANADENSE L. ssp. CANADENSE. *L. canadense* L., Sp. Pl. 1: 303. 1753; *L. penduliflorum* DC. ex Redouté, Les Liliacées 2: 105. 1805 (non vidimus); *L. pendulum* Spae, Mém. Cour. Ac. Roy. Sc. Brux. Vol. 19, Essai d'une monographie du genre *Lis*, p. 28. 1847 (non vidi-

mus) nec *L. pendulum* Noronha 1790. Leaves usually scaberulous along the margin and along the nerves underneath; flowers solitary to umbellate (occasionally disposed in a group of umbels); tube with a green zone at base up to 10 mm. long; tepals recurved from near the middle, but not reflexed, yellow to orange, occasionally suffused with red, or completely red; midrib of petal more or less rounded on back; stamens and style included or only slightly exerted; filaments straight, rarely curved; anthers commonly oblong to lance-oblong, nearly always straight, usually less than 12 mm. long.

LILIUM CANADENSE L. var. *CANADENSE*. Median cauline leaves lanceolate to linear-lanceolate, usually more or less acuminate at tip; flowers commonly yellow to orange, often suffused with red, rarely deep red; petals usually broad.

LILIUM CANADENSE L. f. *CANADENSE*. *L. canadense flavum* Pursh, Fl. Am. Sept. 1: 229. 1814; *L. canadense flavum* Hort. ex Waugh, Bot. Gaz. 27: 356. 1899; *L. canadense* var. *flavum* (Hort. ex Waugh) Waugh ex Bailey, Cycl. Am. Hort. 2: 922. 1900; *L. canadense* f. *flavum* (Hort. ex Waugh) Vict., Contr. Lab. Bot. Un. Montr. 14: 15. 1929; *L. canadense* var. *luteum* Waugh ex Bailey, Cycl. Am. Hort. 2: 922. 1900 (nomen alternativum). Flowers yellow to orange, occasionally suffused with red; petals commonly broad. Specimens examined from Nova Scotia, New Brunswick, southern Quebec, New York, Pennsylvania and West Virginia.

LILIUM CANADENSE L. f. *RUBRUM* Britton, Bull. Torr. Bot. Club 17: 125. 1890; *L. canadense* var. *rubrum* (Britton) Waugh ex Bailey, Cycl. Am. Hort. 2: 922. 1900; *L. canadense* β *coccineum* Pursh, Fl. Am. Sept. 1: 229. 1814. Flowers red; petals up to 20 mm. across, usually about 15 mm. broad. Specimen examined from southern Quebec (Huntingdon Co.).

LILIUM CANADENSE L. var. *EDITORUM* Fernald, Rhodora 45: 393. 1943; *L. canadense* ssp. *editorum* (Fernald) Wherry, Bartoniana 24: 7. 1947. Median cauline leaves elliptic or oblong to oblong-lanceolate, not acuminate at tip; flowers red; petals narrower, 8-13 mm. across, usually less strongly recurved than in the preceding variety. We have only two specimens at hand. This variety is reported to grow in mountains and upland dry woods from Pennsylvania and southern Indiana south to Alabama.

LILIUM CANADENSE L. ssp. *MICHIGANENSE* (Farwell) stat. n., *L. michiganense* Farwell, Bull. Torr. Bot. Club 42: 353. 1915; *L. michiganense* Farwell, var. *umbelliferum* Farwell, Bull. Torr. Bot. Club 42: 353. 1915; *L. michiganense* Farwell f. *umbelliferum* (Farwell) Wherry, Bartoniana 24: 8. 1947. *L. pardalinum* Kellogg var. *Bourgaei* Baker, Journ. Linn. Soc. London, Bot. 14: 242. 1875. Leaves usually scaberulous as in ssp. *canadense*; inflorescence also as in ssp. *canadense*; tepals strongly recurved from below the middle or from near the base, the tips nearly reaching or surpassing the base of the tube as in ssp. *superbum*; flowers orange, commonly reddish; color at base of the tube as in ssp. *canadense*;

midrib of the petal as in ssp. *canadense*, or rarely more or less sharply ridged as in ssp. *superbum*; stamens and pistil long-exserted, usually by about half their length; filaments usually outwardly curved, sometimes incurved again at tip, rarely straight or nearly so; anthers as in ssp. *canadense*. Specimens seen from southern Ontario, Indiana, Illinois, Michigan, Wisconsin, Minnesota and Kansas.

The most reliable distinguishing character between this and the preceding subspecies is the degree of curvature of the tepals. Of all the specimens at hand there is only one which is intermediate in this character: *Cameron* at Niagara Falls, Ont., July 1892. It is a single-flowered plant with spreading tepals as in ssp. *canadense*, but with filaments as in ssp. *michiganense*. As this specimen comes from an area where ssp. *canadense* is not known to occur we have referred it to ssp. *michiganense*.

For an interpretation of var. *Bourgaei* Baker, see Stoker, Roy. Hort. Soc. Lily Year-Book 4: 26. 1935. The type of this variety was reputedly collected in Manitoba "ad ripas lacus Winnipeg" by Bourgeau, but we seriously doubt the accuracy of this geographical statement as no specimen of this very showy plant has ever turned up since or before from anywhere in Manitoba. Furthermore, Bourgeau's localities are notoriously incorrect.

Four phases of this subspecies have been recognized variously as species, subspecies, varieties or forms. These phases may represent no more than ecological forms or more vigorous or depauperate individuals, yet the vigor of some individuals may be susceptible of being segregated genetically. Since this subspecies is definitely of horticultural value, it seems desirable to recognize the two extreme forms as follows:

LILIUM CANADENSE L. ssp. MICHIGANENSE f. **uniflorum** (Farwell) stat. n. *L. michiganense* Farwell var. *uniflorum* Farwell, Bull. Torr. Bot. Club 42: 353-4. 1915; *L. michiganense* Farwell f. *uniflorum* (Farwell) Wherry, Barton 24: 8. 1947. Plant usually smaller throughout; flower solitary, terminal. Throughout the range of the subspecies.

LILIUM CANADENSE L. ssp. MICHIGANENSE f. **peramoenum** (Farwell) stat. n. *L. peramoenum* Farwell, Bull. Torr. Bot. Club 42: 354. 1915; *L. michiganense* Farwell f. *peramoenum* (Farwell) Stoker, Roy. Hort. Soc. Lily Year-book 4: 27. 1935. The whole plant more vigorous; leaves more numerous, eight to sixteen to a whorl; flowers large and very numerous. Throughout the range of the subspecies.

The typical phase (forma *michiganense*), including var. *umbelliferum* Farwell, was originally described as having from 5 to 8 flowers. Yellow-flowered mutants have been reported by Wherry, *Rhodora* **44**: 454. 1942, but this phase has not been described and is not clearly represented among the material at hand.

LILIUM CANADENSE L. ssp. **superbum** (L.) stat. n. *L. superbum* L., Sp. Pl. ed. 2: vol. 1: 434. 1762. Leaves smooth or sometimes minutely papillose along the margin and the veins underneath; inflorescence umbellate to racemose; flowers orange-red; green zone at base of tube 10–15 mm. long; tepals strongly reflexed as in ssp. *michiganense*; petals sharply ridged on back along the midrib; stamens and pistil long-exserted; filaments recurved; anthers arcuate, linear, 11–25 mm. long.

This subspecies has been reported to range from Georgia and Alabama north to New Hampshire, New York and perhaps Indiana. This range should be extended to include Maine as we have at hand an excellent sheet of this subspecies (*H. N. Moldenke* 18994, Penobscot Co., South Lincoln, July 27, 1947).

Color mutants have been reported for this subspecies, but none has been named and none is represented among the material at hand.

In a recently published chromosome study, R. N. Stewart (The morphology of somatic chromosomes in *Lilium*, *Am. Jour. Bot.* **34**: 9–26. 1947) has, on the basis of their karyotypes, brought together within the same subgroup *L. superbum*, *L. philadelphicum*, *L. catesbaei*, *L. carolinianum* (= *L. michauxii*), *L. michiganense* and *L. canadense*. He remarks: "Five plants of *L. canadense*, two of *L. canadense* var. *rubrum* and two of *L. canadense* var. *flavum* all possessed identical karyotypes and all were indistinguishable from *L. michiganense*." The identity of the karyotypes confirms the opinion previously expressed by Wherry that these two taxa are very closely related indeed. Another taxon of the same subgroup, *L. superbum*, is also closely related to *L. canadense*. A fourth taxon, *L. michauxii* (= *L. carolinianum*), clearly belongs with the *L. canadense* group, but the lack of adequate herbarium material does not allow us to express a considered opinion as to its relative taxonomic status. It is, however, noteworthy that it was at one time reduced to varietal rank as *L. superbum* L. var. *carolinianum*

(Michx.) Chapman. The last two taxa, *L. philadelphicum* and *L. catesbaei*, have erect flowers, long-unguiculate tepals, etc. and are not particularly closely related to the *L. canadense* group.

A key to the major taxa described above has been published by E. T. Wherry, *A Key to the Eastern North American Lilies*, *Bartonia* 24: 5-8. 1947.

The present study is based primarily on the specimens preserved in the Herbarium of the Botany and Plant Pathology Division, Science Service, Department of Agriculture, Ottawa (DAO), supplemented by those preserved in the Herbarium of the National Museum of Canada, Ottawa (CAN).

NUTTALL'S QUARREL WITH PURSH

JEANNETTE E. GRAUSTEIN

UNTIL 1936 there was no certainty about Thomas Nuttall's activities or location in 1812 and the years immediately following. Although we are now far better informed, little attention seems to be paid to the light which has been shed on this period. Thinking has not been brought into line with the facts that have been established.¹

Of first importance in Nuttall's situation was his contract with Professor Benjamin Smith Barton, signed on April 7, 1810, before starting on his long expedition through the northwestern Territories. By the contract his journals and observations were the exclusive property of Barton who financed the journey; he was, however, permitted to retain a part of all the specimens which he collected but must not dispose of them without Barton's consent less "they might otherwise fall into the hands of persons who would use them to my disadvantage." "Should I ever publish the journal, I hereby promise and bind myself to make a public acknowledgement, that the journey was performed by you, and to give you full credit for what services you may have rendered to me."

When Nuttall arrived at New Orleans in December, 1811,

¹ F. W. PENNELL, *Travels and Scientific Collections of Thomas Nuttall*, *Bartonia* 18 (1936), 1-51.

Jeannette E. Graustein, "Nuttall's Travels into the Old Northwest," *Chronica Botanica* 14 (1950/51), 1-88.

on his return from the upper Missouri, he found the COLUMBIA about ready to sail for Liverpool, the familiar ground of his apprenticeship and his home port which he had left almost four years before. Added to the natural desire of a young man (approaching his twenty-sixth birthday) to visit his family after so long a separation, was the serious threat of war between the United States and England which might postpone such a visit indefinitely. Before embarking for Liverpool he sent to Barton his share of dried plants and seeds with memoranda. There is evidence that in the notes he indicated his intention of naming the most flamboyant plant of his collection (which he believed belonged in an undescribed genus) in honor of Barton.

When Nuttall reached England early in 1812 he had no intention of publishing anything but *Bartonia*; not only was he legally restrained but he knew that to his patron any further publication would be an unforgivable sin. In 1810 Barton described Nuttall as distinguished by "innocence of character," and that was his reputation with the Astorians. He was so lacking in guile that his one treasured genus was snatched from him by the unscrupulous Pursh. That his quarrel with Pursh was strictly limited to the theft of the genus *Eartonia* has not been widely understood.

Nuttall met Pursh in London—doubtless at the Banksian Herbarium—and, since Barton had been the patron of both, eagerly showed him a specimen of the proposed *Bartonia* and the notes concerning it which he was planning to publish. Shortly thereafter, in August 1812, *Bartonia decapetala* appeared in the *Botanical Magazine* under Pursh's name although the accompanying colored plate was done from Nuttall's specimen. This was the grievance Nuttall held against Pursh—that he filched from him the only plant that he was free to publish from among the abundant and interesting specimens collected during two arduous and hazardous years. It was a cruel disappointment: it would have been Nuttall's first publication of any kind; it might have modified the disapproval of his somewhat estranged uncle whose support could facilitate his chosen work; it deprived him of the small unit of recognition in the botanical world for which he had hoped, leaving him with experience as his harvest from two years of labor.

Nuttall evidently drew a line between scientific botany and floriculture and between scientific collections and horticultural so far as his contract was concerned for he sold to Fraser seeds and living plants which he had laboriously transferred to England. He needed any funds they might bring. There is no doubt that he drew up the Fraser Catalogue.² It is equally certain that he did not consider it a valid publication of the species involved. That he intended to stand by his contract with Barton is indicated by the fact that he made no attempt to publish any of his new species in the *Botanical Magazine*—a device by which he could have anticipated a few items at least of Pursh's *Flora*—and remained aloof while others became authors of his plants in that publication.

When Pursh's *Flora Americae Septentrionalis* appeared in mid-December 1813, Nuttall was disturbed by the treatment of many of the species, especially the new plants of the West. He found the descriptions scant, habitats lacking, range erroneous, and in some cases he disagreed with the classifications. These deficiencies were to an appreciable extent the result of Pursh's limited field knowledge for he had not been south of Virginia nor west of the Appalachians. It became Nuttall's aim to write a new edition of Pursh's *Flora* in order to correct the errors. Although Shinnars calls him "secretive" he announced this intention to William Baldwin in the autumn of 1815 not long after his return from England, and there can be no doubt that he told Zaccheus Collins and other friends of his plans. The outcome of this urgent wish was *Genera of North American Plants and a Catalogue of the Species to the Year 1817*, a work which grew from concern over the inadequacies of Pursh's *Flora* and which naturally, therefore, comments freely on Pursh's errors. This perhaps is the basis for Shinnars' opinion that Nuttall "was resentful of Pursh's having anticipated him in publishing." Since Nuttall had known from the first that he could not publish the plants collected under Barton's aegis he had nothing personally at stake in the matter.—501 W. 113, NEW YORK CITY.

² No convincing evidence to the contrary has been furnished by Lloyd H. Shinnars in questioning Nuttall's authorship in "Non-Validity of Nuttallian Names in Fraser's Catalogue." *RHODORA* 57: 290-293, 1955.

VALIDITY OF NUTTALL'S NAMES IN
FRASER'S CATALOGUE

ARTHUR CRONQUIST, DAVID D. KECK AND BASSETT MAGUIRE

Dr. Lloyd Shinnars has maintained in a recent issue of *Rhodora* (57: 290-295. 1955) that the names usually attributed to Nuttall in Fraser's Catalogue, even those accompanied by descriptions, were not validly published. Fraser's Catalogue, an English nursery-firm's pamphlet that appeared in 1813, was published without formal indication of an author, but it is universally acknowledged that many or all of the new names contained in it were those of Thomas Nuttall. Many of these names were later republished by Nuttall with full descriptions, sometimes with a reference to Fraser's Catalogue, sometimes without.

Dr. Shinnars shows that botanists have not been entirely consistent in their approach to Fraser's Catalogue, with the result that its rejection would displace some well known names, even while preserving others. *Penstemon grandiflorus* Nutt., which has regularly been accepted in floras and monographic work dating back at least to the fifth (1829) edition of Amos Eaton's Manual of Botany, would for example be replaced by the unfamiliar *P. bradburyi* Pursh if Fraser's Catalogue is banished to a nomenclatural limbo. We believe that the interests of nomenclatural stability would be better served by the admission of Fraser's Catalogue as a proper publication than by its rejection, but we do not rely on that argument to support our position.

Dr. Shinnars argues that Nuttall was not himself the author of Fraser's Catalogue, and this may perhaps be true in a strictly literal sense, although it is obvious that the descriptions and comments accompanying some of the names must be Nuttall's own. Dr. Shinnars further states that since the names were "anonymous as published," and "not avowedly accepted by any author," they are not validly published. Presumably he is relying here on Article 43 of the International Code of Botanical Nomenclature (Utrecht, 1952), which says that "A name (1) which is not accepted by the author who published it . . . is not validly published." This rule, however, as shown both by the examples and by the published discussion (Proc. 6th Int.

Bot. Congr. 1: 364-366. 1936. Leiden) which preceded its original adoption, clearly pertains only to the intent of the author as expressed in the published work itself. If a name is formally and intentionally used, the pertinent part of Article 43 is complied with. It matters not that the author may change his mind, or never again use the name, so long as he has accepted it in the published work.

Dr. Shinnery's contention that the names in Fraser's Catalogue were really anonymous, rather than being properly attributable to Nuttall, is immaterial. Anonymity of the author is no bar, under the Rules, to validity of publication of a name. Dr. Shinnery suggests that his attempt to disqualify anonymous names in Fraser's Catalogue is merely an application of a principle propounded by Rousseau (Taxon 4: 40-42. 1955) in the latter's attempt to dispose of the anonymous generic name *Americus*. We do not wish to comment on the status of *Americus* at this time, but we would point out that the question raised by Rousseau as to the serious intent of the author of *Americus* does not apply to the names used in Fraser's Catalogue.

Dr. Shinnery points out that some of Nuttall's names published in Fraser's Catalogue were later taken up by him, while others were not. From this situation he concludes that "His inconsistent treatment gives us sufficient legal grounds, if anonymity be not enough, to disregard all names in the Catalogue." We disagree. The names in Fraser's Catalogue were accepted in that published work by whoever wrote it, and the subsequent action of Nuttall or any other possible author has no bearing on the validity of their publication.

Without at this time trying to determine what constitutes a "description" under Article 42 of the Rules, we believe that those new names which appeared in Fraser's Catalogue, accompanied by descriptions, are validly published.—THE NEW YORK BOTANICAL GARDEN.





PLATE 1222. *Ilex glabra* f. *leucocarpa*.

ILEX GLABRA FORMA LEUCOCARPA:
A WHITE-FRUITED HOLLY

FRANK W. WOODS¹

In November 1954, a white-fruited specimen of *Ilex glabra* (L.) Gray was observed about 4 miles south of Marianna, Florida. The characterization of this hitherto undescribed color form of the species follows:

Ilex glabra (L.) Gray f. ***leucocarpa*** F. W. Woods, f. nov. A forma typica drupis albis, non nigris, differt. As in the typical form but with white rather than black drupes. Both the drupe and the persistent calyx are entirely devoid of pigment. Albinism also extends to the leaves, which are a distinctly lighter green color than immediately adjacent and normally pigmented specimens of *I. glabra*.

The specimen exhibits the typical growth form of *Ilex glabra*, being many-stemmed as a result of sprouting from rhizomes after being burned. Sprouts from rhizomes as far as 0.5 meter from the main clump also bear white fruits. There appears to be a single clone, covering an area of about 0.2 square meter.

A more detailed description of this new form follows: Leaf blade obovate, glabrous, lustrous, coriaceous, 1–2 cm. wide, 2–3.5 cm. long, margin remotely serrate at the distal end but otherwise entire; petiole 4–6 mm. long, round, glabrous. Fruit white, borne singly, 5–6 mm. long, 6–8 mm. wide; nutlets smooth; peduncle 4–6 mm. long; calyx glabrous, white. Twigs light green, angular toward the tip. A shrub 1.5 meters tall, similar to and growing in association with other specimens of dark-fruited *Ilex glabra*. Foliage is somewhat lighter than the neighboring specimens.

The habitat of *I. glabra* f. *leucocarpa* is identical to that of the typical form. Soil is moist and sandy. Principal associates are the typical form of *I. glabra*, *Baccharis*, *Rubus*, *Myrica*, *Pinus serotina*, and *P. palustris*.


Edge of woods about 4 miles south of Marianna, Jackson County, Florida, Jan. 20, 1955, *Frank W. Woods, C.E.F.* 2, holotype deposited in U. S. National Herbarium of U. S. National Museum, Washington, D. C. Isotypes have been presented to herbaria of U. S. Forest Service


¹ Stationed at East Gulfcoast Research Center, Marianna, Florida.

at Washington, D. C. and New Orleans, La., Gray Herbarium of Harvard University, New York Botanical Garden, Missouri Botanical Garden, Chicago Natural History Museum, University of Florida, Florida State University, University of Georgia, University of Tennessee, and University of Alabama.—SOUTHERN FOREST EXPERIMENT STATION, FOREST SERVICE, U. S. DEPT. OF AGRICULTURE.

VIABILITY OF SEED OF THE BLACK LOCUST.—In the early spring of 1930, on property now owned by Orland H. Soule, of Schoolcraft, Michigan, a mulberry hedge was set. In preparation for the planting a trench about eight inches deep was made. This brought to the surface some of the deeper soil. Later in the same season along a five-rod length of this planting 57 seedlings of black locust, *Robinia Pseudo-Acacia*, two and three inches high were counted at one time.¹

I learned that locust trees that had been killed by borers were cut down in 1867 on property belonging to Dr. Nathan Thomas. The Thomas family kept diaries and I had first-hand the information about the time and the condition of the trees when cut. The trees had been on the east side of a four-rod street; the mulberry hedge, set in 1930, was directly opposite on the west side. I have been familiar with these two homes for the past 60 years and no trees of this species have been there during that period.

At the time the locust trees were removed wooden sidewalks were used and yards were enclosed by fences. The locust legumes naturally lodged against the fence and renewal of parts of sidewalk and posts for the fence placed some of the seeds where germination would cease. Locust seed is very hard and sprouts only under the most favorable conditions. Some years ago to get locust seedlings for future fenceposts the writer soaked the seed for several days. Each morning it was stirred in boiling water. 

The mulberry hedge mentioned proved a nuisance and was cut in 1954.  If it had been pulled out some of the deeper soil would have been brought to the surface and a favorable opportunity afforded to discover whether any seeds were still viable after another 25 years. The only remaining project

¹ HANES, CLARENCE R. AND FLORENCE N. *Flora of Kalamazoo County, Michigan*. 167: 1947.

was to exchange soil. Mrs. Hanes and I did this May 7, 1955. The top four inches of soil, between sidewalk and the roots of the mulberries, were taken out at two separate spots, each one by two feet in area. Then two bushels of the deeper soil were removed, one bushel of which was taken to our home and the other returned to the place from which it had been dug, only it was topside now. At our home we placed the soil in a plot two feet square and about four inches deep. The plot was well watered before and after the soil had been deposited.

We understood the chance for success in picking up soil with viable seeds was almost nil. Would the seed be present in the small amounts of soil under observation and if there were any, would they still be viable? We were pleasantly surprised for we have on July 12, 1955 in our home plot two vigorous locust seedlings, the one five inches, the other three inches high. The latest leaves of these have nine and seven leaflets respectively.

The home plot was well watered; the one along the hedge on the Soule's property had only the natural rainfall, which was scarce in early June but much more abundant later. At the time this paper was written, July 12, 1955, two small seedlings large enough, however, to show their identity had appeared.

The fact that four locust seedlings have grown in soil from the same location 25 years after the 57 that were discovered in 1930 appears to substantiate the conclusion that these seeds, dormant since the close of the Civil War, came from the trees cut in 1867. Some black locust seeds therefore stay viable for at least 88 years. We cannot say how long before 1867 the trees ceased to bear fruit.—CLARENCE R. HANES, SCHOOLCRAFT, MICHIGAN.

SILENE VIRGINICA IN THE GULF STATES.—The occurrence of *Silene virginica* L. in north Louisiana was first reported to me by Mr. Roy Morgan, a professional forester working in this area. In addition to his collection from Union Parish, I have collected it along the south side of D'Arbonne Bayou basin in northeast Lincoln Parish.

Hitchcock and Maguire¹ show the species as occurring in extreme northeast Arkansas only, and not in Louisiana or in

¹ HITCHCOCK, C. LEO AND BASSETT MAGUIRE. A revision of the North American species of *Silene*. Univ. Washington Publ. Bot. 13: 1-71. 1947.

the states immediately east of Louisiana. The only previous Louisiana reports are those of Riddell² and the statement of Miss Dormon "In rich soil from Georgia to Louisiana."³ In a recent letter, Miss Dormon stated that she and her sister collected the species "in the vicinity of Shreveport."

The Union and Lincoln parish stations are about 150 airline miles from the nearest reported Arkansas collection. The col-



Fig. 1. Distribution of *Silene virginica* L. in the Gulf States.

lection from the Natchitoches area reported by Mr. George Ware of Northwestern State College (Fox, April 13, 1939) is about 135 miles south of the nearest known Arkansas collection, and about 70 miles from the Lincoln parish station. The report of Miss Dormon fills in some of the range gap that was previously apparent.

Further interest in the distribution of the species led to a request to southern botanists⁴ for distribution data for the gulf states as shown by their herbaria. The accompanying map is based on the literature cited and on the information furnished by cooperating botanists.

² RIDDELL, J. L. *Catalogus florae ludovicianaë*. New Orleans Med. & Surg. Journ. 8: 743-764. 1852.

³ DORMON, CAROLINE. *Wild Flowers of Louisiana*. New York. 1934.

The county records reported to me are summarized together with their source as follows:

Arkansas: Benton, Carroll, Clay, Garland, Hempstead, Little River, Marion, Newton, Polk, Searcy, Washington (Iltis); Fulton, Hot Springs, Independence (Goodman); Sevier, Stone (Tharp); Pope (Shinners); Baxter (Schmitt). **Louisiana:** Lincoln, Union (Moore); Natchitoches (Ware); Caddo (Dormon). **Mississippi:** Lafayette, Lee (Schmitt); Okitbeha (Ray); Grenada, Kemper, Tippah, Union (Lowe).⁵ **Alabama:** Lee, Marshall (Davis); Calhoun (Sharp); Randolph, Tuscaloosa (Shinners); Clark, Cullman, Montgomery (Mohr).⁶ **Georgia:** Bartow, Burke, Clark, Cobb, Dade, DeKalb, Floyd, Forsythe, Fulton, Gwinnett, Heard, Lumpkin, Rabun, Walker, Whitfield (Duncan); Dawson (Shinners); Meriwether (Tharp).—JOHN ADAM MOORE, DEPARTMENT OF BOTANY, LOUISIANA POLYTECHNIC INSTITUTE, RUSTON, LOUISIANA.

⁴ Botanists cooperating were: Donald E. Davis, Alabama Polytechnic Institute; Wilbur H. Duncan, The University of Georgia, Miss Caroline Dormon, Saline, La. George J. Goodman, University of Oklahoma, Hugh H. Iltis, University of Arkansas; James D. Ray, Jr., Mississippi State College; John A. Schmitt Jr., University of Mississippi; A. J. Sharp, University of Tennessee; Lloyd H. Shinners, Southern Methodist University; B. C. Tharp, University of Texas; George Ware, Northwestern State College.

⁵ LOWE, E. N. *Plants of Mississippi*. Miss. Geol. Survey Bull. 17. 1921.

⁶ MOHR, CHARLES. *Plant life of Alabama*. Contr. U. S. Nat. Herb. 6. 1901.

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